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Short Communication

Suicide trends varied by age-subgroups during the COVID-19 pandemic in 2020 in Taiwan

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Background/purpose: The outbreak of the Coronavirus disease 2019 (COVID-19) has led to unprecedented impact on mental health globally. Recent empirical data however, indicated that suicide rates in many countries remained unchanged or even decreased. Existing studies assessed the overall rates and did not stratify by age-subgroups.

Methods: We used an interrupted time-series analysis to model the age-stratified (<25, 25–44, 45–64, ≥65) trends in monthly suicide rates before (January 1st, 2017 to December 31st, 2019) and after (January 1st 2020 to December 31st 2020) the outbreak of COVID-19 in Taiwan.

Results: We found a slight decrease in overall suicide rates after the outbreak (annual average rates were 16.4 and 15.5 per 100,000 population, respectively, $p = 0.05$). Age-stratified analysis indicated that suicide rates increased in younger (<25) and decreased in the middle age group (25–64 years). In older age groups (≥65), an immediate rate decrease was observed followed by a sustained upward trend during the onset of the pandemic.

Conclusion: Although an overall decrease in annual suicide rates was found after the outbreak, the age-specific subgroup analysis reveals a more nuanced picture. Stratified analysis is crucial to identify vulnerable subgroups in the midst of the pandemic.

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Introduction

Since the start of the COVID-19 pandemic, there have been concerns that suicides would increase due to the accumulation of a plethora of suicide risk factors, such as social isolation, economic stress and decreased access to medical and mental health care.¹ However, recent empirical data from several countries seem to indicate no significant increase or even a decrease in the first few months after the COVID-19 pandemic began.^{2,3} The majority of the studies did not conduct subgroup analyses, and as a result, an increase of suicide in specific high risk sub-groups might be hidden under the overall rates. Only one study we know of performed subgroup analysis by race, in Maryland, USA, where researchers found that the overall suicide rates did not notably change in 2020; however, the rates doubled in Black populations and prominently decreased in White populations.⁴

No study has characterized suicide trends in the midst of the COVID-19 pandemic in Taiwan. The current study examined pre- and post-pandemic suicide rates in Taiwan, and stratified analysis by age groups were also conducted.

Methods

Data

Suicide mortality data from the period of January 2017 to December 2020 provided by Taiwan's Ministry of Health and Welfare to Taipei City Psychiatric Center were used for the current analysis. Taipei City Psychiatric Center, the 1st author's affiliation, is one of the seven core institutions of the Psychiatric Service Networks organized by Taiwan's Ministry of Health and Welfare.⁵ These core institutions take charge of community mental health care in Taiwan, their missions include suicide prevention, treatment and prevention of alcohol/substance use, implement rehabilitation programs for the mentally ill, to name a few.⁶ Taiwan's Ministry of Health and Welfare provides suicide statistics to these core institutions each month, information provided include number of suicide deaths per month by age groups in each city/county.

Analytic strategies

Interrupted time series analysis^{7,8} was conducted to evaluate longitudinal effects of COVID-19 pandemic on monthly suicide trends in Taiwan. The first COVID-19 case in Taiwan was reported in January 2020; hence, January 2020 was defined as the onset of the pandemic in the current study. The influence of COVID-19 was introduced as a dummy variable that has the value of 0 prior to the pandemic (Jan 2017–Dec 2019) and the value 1 for the twelve months following its onset (Jan 2020–Dec 2020). We examined effect of time trend in months, the influence of COVID-19 pandemic in the series and time trend change after COVID-19 on monthly suicide rates (per 100,000). A chi-square test statistic was applied to examine the evenness of the monthly average suicides for the study period, while

the residual plot of the fitted model together with Durbin–Watson statistics were used to confirm the appropriateness of models fitting.

The findings for overall suicide rates and age-stratified suicide rates were illustrated. The analysis was conducted using the SAS version 9.4. The study used aggregated data and applied a waiver of ethical review from the Research Ethics Committee (REC) of the Taipei City Hospital (TCHIRB-11007004-W).

Results

A total of 15,256 suicides were identified for the period 2017–2020 (11,600 prior to the pandemic and 3656 in 2020). We observed a marginal decrease in estimated average monthly suicide rates after the outbreak (1.37 and 1.29 per 100,000 population, respectively, $p = 0.05$) (Fig. 1 and Appendix Table 1). This is equivalent to annual average suicide rates of 16.4 pre-pandemic and 15.5 per 100,000 population afterwards. Our results indicate that before the COVID-19 pandemic, the average suicide rate per month was 1.37 (per 100,000) and, after the onset of the pandemic, the estimated mean rate dropped by 0.08 (per 100,000) ($p = 0.05$). Apart from this slight fall, there was no significant month-to-month change in the mean rate of suicide between January 2017 and December 2020 (i.e. the slope term in Appendix Table 1 was not significant). Furthermore, the onset of the pandemic did not significantly affect the overall suicide trends (i.e. the interaction term for COVID-19 and time was not significant). Fig. 1 illustrated the overall suicide rates trends before and after the pandemic.

In people younger than 25 years, suicide rates increased prior to the pandemic (Jan 2017–Dec 2019) and continued to increase after the onset of the pandemic (Jan 2020–Dec 2020) (Fig. 2); the slope term for time trends was positive and significant (Appendix Table 1, $p = 0.00$). For people aged 25–44 and 45–64 years, suicide rates decreased over time during the study period ($p = 0.02$ and $p = 0.00$, respectively). The influence of COVID-19 pandemic was not significant for these subgroups (below 25, 25–44, and 45–64 years), neither level change nor the slope altering on the monthly rates for the twelve months following its onset. In older people (65+ years), a mild downward trend was observed before the outbreak ($p = 0.05$). While after the onset of COVID-19 pandemic, an immediate decrease in suicide rate early in January 2020 was followed by a sustained but reversed upward trend during the pandemic onset (Fig. 2 and Appendix Table 1, $p = 0.05$). Neither serial autocorrelation nor seasonal fluctuations were detected in our study.

Discussions

The overall decrease of suicide rate in Taiwan after the pandemic was the aggregated results of a decrease and increase in specific age group rates. Suicide rates for people aged 25–64 years mirrored the overall trend, decreasing after the pandemic onset. For young Taiwanese,

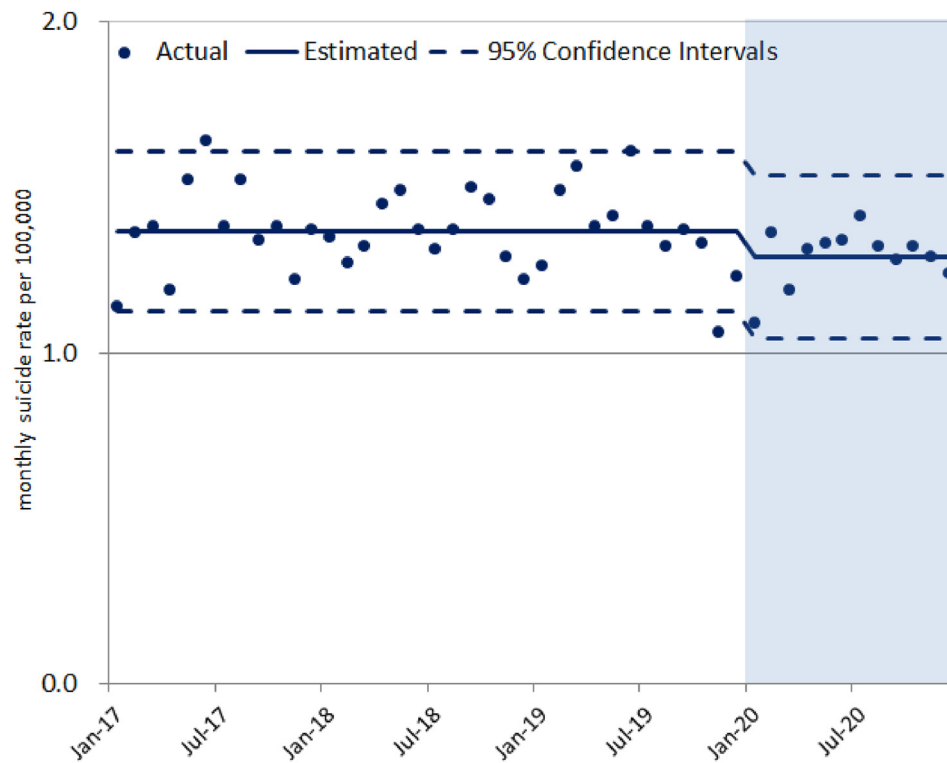


Figure 1 The actual and estimated overall suicide rate trends before (Jan. 2017–Dec. 2019) and after (Jan. 2020–Dec. 2020) the COVID-19 outbreak in Taiwan.

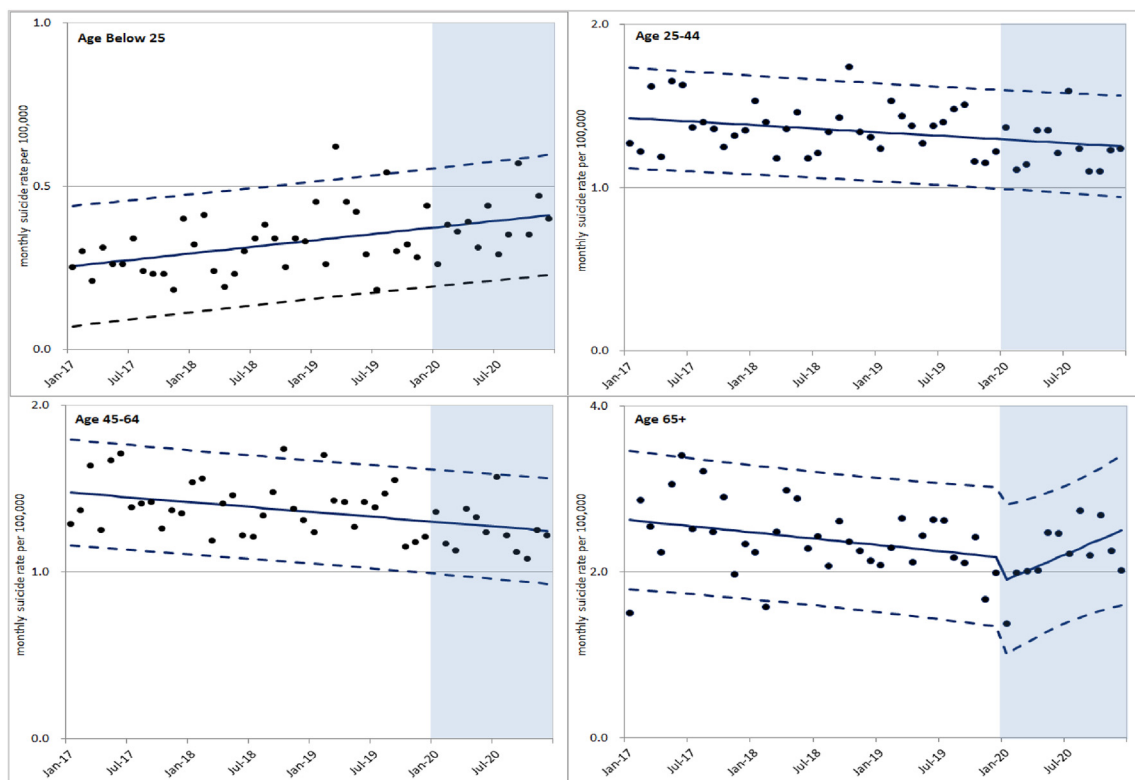


Figure 2 The actual and estimated suicide rate trends before (Jan. 2017–Dec. 2019) and after (Jan. 2020–Dec. 2020) the COVID-19 outbreak by age groups in Taiwan.

the increased pre-and post-pandemic suicide rate could reflect recent global concerns about deteriorating youth mental health (e.g. internet addiction, substance abuse, decrease of family support) related to broader issues than just the pandemic.⁹ The increased post-pandemic suicide rate for older Taiwanese might be explained by the sequelae of avoiding medical services and social isolation due to fears about exposure to the COVID-19 virus.¹⁰

In 2020, when lockdown measures were implemented in many places in the world, they were not instituted in Taiwan. Except for additional entry controls (e.g. body temperature and travel history check), there was no pandemic-related change in healthcare delivery in 2020. Elective operations and preventive visits continued, however hospital outpatient visit volumes declined by 14% in the first quarter of 2020, remaining low thereafter.^{11,12} Decreased consumption of medical care could have contributed to poorer health status and increased suicide risk, particularly in the older age group. A previous downward trend of suicide in the older age group reversed after the pandemic. For young age group (<25), the increasing trend started before the pandemic and continued to rise afterwards.

The recent surge in COVID-19 cases in 2021 might result in significant anxiety and stress reactions in the public. These mental health consequences concomitant with economic recession after a series of pandemic restrictions, are likely to aggravate the suicide risk of vulnerable groups the most. Existing studies did not show a marked increase in overall suicide rates in places heavily ravaged by COVID-19.² For example, in Italy, Spain and the USA, suicide rates in the early months of the 2020 did not increase, even though mortality rates from COVID-19 surged.² We propose stratified analysis to disentangle variations in suicide rate between different age groups during the period, such that high risk groups would not be missed in combating the suicidal risk arising from COVID-19.

The current study should be interpreted in light of the following limitations. First, the death records data may be subject to under-reporting.¹³ Second, we did not consider other factors that might affect suicide rate trends, such as economic factors and the incidence of mental illness. Lastly, only ecological data were available, and so we were not able to analyse factors related to suicide at the individual level.

Conclusions

Although COVID-19 did not ravage Taiwan in 2020, a recent surge of COVID-19 cases during May and July 2021 was concerning. Suicide risk was already found to increase in vulnerable subgroups, such as the youngest and the oldest groups in the current analysis. In the face of the latest surge in COVID-19 cases, precautionary actions should be taken to prevent the potential mental health impact of the COVID-19 pandemic in the future.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jfma.2021.09.021>.

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